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EXAMINER	
FUJITA, KATRINA R	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/772,510	Applicant(s) MICHELSSON, DETLEF
	Examiner KATRINA FUJITA	Art Unit 2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 April 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *35-46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *35-46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 29, 2008 has been entered.

Response to Amendment

2. This Office Action is responsive to Applicant’s remarks received on April 29, 2008. Newly added claims 35-46 remain pending.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 35-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Arai et al. (US 4,870,693) and Shibata et al. (US 2002/0089664).

Regarding **claim 35**, Arai et al. discloses a method in the field of endeavor of mask inspection (“mask inspecting apparatus” at col. 1, line 35) comprising:

dividing the mask into stepper area window SAW segments, all SAW segments having same dimensions (“DA, DB and DC read from the data file 10 into the data processing circuit 14 are converted for each block B(m,n) (FIG. 19) by the data processing circuit 14 and are stored in the magnetic disk 12” at col. 9, line 2);

assigning to each of the SAW segments a unique SAW segment index, defining a set of defined SAW segment indices (“design data BD(m,n) of the block B(m,n)" at col. 9, line 36; figure 22; each block is assigned BD)

defining image field segments adjacent to each other within an image field of a camera (figure 20; figure 1, numeral 25), the image field segments having the same image dimensions as images of SAW segments within the image field of the camera (“during inspection of the flaw of the mask, the design data of the pertinent block is read out from the magnetic disk 12 by the data processing device 14 in the order of the scanning by the line sensor" at col. 11, line 11; as the system is aware of the pertinent design data for the current block image data being read, the blocks are the same size such that comparison may be made), the area covered by the image field segments

within the image field of the camera having different image dimensions that the images of the mask on the wafer within the image field of the camera (the total area covered by the image segments in figure 20 has different dimensions than the individual block images of the mask);

assigning to each image field segment a unique image segment index (as seen in figure 20, each block has an address of B(m,n));

capturing images of the mask with the camera at different positions of the camera and the mask with respect to each other (figure 20 as it pertains to generating reference design data and subsequent inspection data), image field segments within at least some images representing SAW segments of adjacent images of the mask on the wafer (the image field segments are within the SAW segment images as they correspond to each other for comparison purposes);

storing the captured images (both the design data and the inspection data are stored in memory as seen in figures 1 and 23);

for each stored image, assigning a defined SAW segment index to at least one image field segment within the image according to the positions of the camera and the mask with respect to each other when the image is captured ("during inspection of the flaw of the mask, the design data of the pertinent block is read out from the magnetic disk 12 by the data processing device 14 in the order of the scanning by the line sensor" at col. 11, line 11; as the system is aware of the pertinent design data for the current block image data being read, the design data BD(m,n) is assigned to each image segment); and

comparing contents of image field segments of stored images with each other (figure 1, numeral 24), wherein each compared field segments of each pair of compared field segments has the same SAW segment index and the same image segment index (each subsequent mask to be inspected for a single reference design mask will have the blocks indexed in the same manner as described above).

Arai et al. does not disclose a method for analyzing a semiconductor wafer exposed multiple times using the mask.

Shibata et al. discloses a method for analyzing a semiconductor wafer exposed multiple times using a mask (figure 2).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to analyze the semiconductor wafer of Shibata et al. in the apparatus of Arai et al. to be able to inspect the quality of an entire wafer when “a similar pattern is formed in every die (chip)” (Shibata et al. at paragraph 0032, line 2).

Regarding **claim 38**, Arai et al. discloses a method in the field of endeavor of mask inspection (“mask inspecting apparatus” at col. 1, line 35) comprising:

dividing the mask into stepper area window SAW segments, all SAW segments having same dimensions (“DA, DB and DC read from the data file 10 into the data processing circuit 14 are converted for each block B(m,n) (FIG. 19) by the data processing circuit 14 and are stored in the magnetic disk 12” at col. 9, line 2);

assigning to each of the SAW segments a unique SAW segment index, defining a set of defined SAW segment indices (“design data BD(m,n) of the block B(m,n)" at col. 9, line 36; figure 22; each block is assigned BD)

defining image field segments adjacent to each other within an image field of a camera (figure 20; figure 1, numeral 25), the image field segments having the same image dimensions as images of SAW segments within the image field of the camera (“during inspection of the flaw of the mask, the design data of the pertinent block is read out from the magnetic disk 12 by the data processing device 14 in the order of the scanning by the line sensor" at col. 11, line 11; as the system is aware of the pertinent design data for the current block image data being read, the blocks are the same size such that comparison may be made), the area covered by the image field segments within the image field of the camera having different image dimensions that the images of the mask on the wafer within the image field of the camera (the total area covered by the image segments in figure 20 has different dimensions than the individual block images of the mask);

assigning to each image field segment a unique image segment index (as seen in figure 20, each block has an address of B(m,n));

capturing images of the mask with the camera at different positions of the camera and the mask with respect to each other (figure 20 as it pertains to generating reference design data and subsequent inspection data), image field segments within at least some images representing SAW segments of adjacent images of the mask on the wafer (the image field segments are within the SAW segment images as they correspond to each other for comparison purposes);

storing the captured images (both the design data and the inspection data are stored in memory as seen in figures 1 and 23);

for each stored image, assigning a defined SAW segment index to at least one image field segment within the image according to the positions of the camera and the mask with respect to each other when the image is captured ("during inspection of the flaw of the mask, the design data of the pertinent block is read out from the magnetic disk 12 by the data processing device 14 in the order of the scanning by the line sensor" at col. 11, line 11; as the system is aware of the pertinent design data for the current block image data being read, the design data BD(m,n) is assigned to each image segment); and

comparing contents of image field segments of stored images with at least one master image (figure 1, numeral 24; the reference pattern data is a master image), wherein each compared field segments of each pair of compared field segments has the same SAW segment index and the same image segment index (each subsequent mask to be inspected for a single reference design mask will have the blocks indexed in the same manner as described above).

Arai et al. does not disclose a method for analyzing a semiconductor wafer exposed multiple times using the mask.

Shibata et al. discloses a method for analyzing a semiconductor wafer exposed multiple times using a mask (figure 2).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to analyze the semiconductor wafer of Shibata et al. in the apparatus of Arai et al. to be able to inspect the quality of an entire wafer when "a similar pattern is formed in every die (chip)" (Shibata et al. at paragraph 0032, line 2).

Regarding **claim 41**, Arai et al. discloses an apparatus in the field of endeavor of mask inspection (“mask inspecting apparatus” at col. 1, line 35) comprising:

a camera (figure 1, numeral 25);

a means for changing positions of the camera and the mask with respect to each other (figure 1, numeral 26 that produces the scanning path in figure 19, which is equivalent to applicant’s disclosed camera mover); and

a processing unit (figure 1, numeral 14) capable of:

dividing the mask into stepper area window SAW segments, all SAW segments having same dimensions (“DA, DB and DC read from the data file 10 into the data processing circuit 14 are converted for each block B(m,n) (FIG. 19) by the data processing circuit 14 and are stored in the magnetic disk 12” at col. 9, line 2);

assigning to each of the SAW segments a unique SAW segment index, defining a set of defined SAW segment indices (“design data BD(m,n) of the block B(m,n)" at col. 9, line 36; figure 22; each block is assigned BD)

defining image field segments adjacent to each other within an image field of the camera (figure 20), the image field segments having the same image dimensions as images of SAW segments within the image field of the camera (“during inspection of the flaw of the mask, the design data of the pertinent block is read out from the magnetic disk 12 by the data processing device 14 in the order of the scanning by the line sensor" at col. 11, line 11; as the system is aware of the pertinent design data for the current block image data being read, the blocks are the same size such that comparison may be made), the area covered by the image field segments within the image field of the

camera having different image dimensions that the images of the mask on the wafer within the image field of the camera (the total area covered by the image segments in figure 20 has different dimensions than the individual block images of the mask);

assigning to each image field segment a unique image segment index (as seen in figure 20, each block has an address of B(m,n));

capturing images of the mask with the camera at different positions of the camera and the mask with respect to each other (figure 20 as it pertains to generating reference design data and subsequent inspection data), image field segments within at least some images representing SAW segments of adjacent images of the mask on the wafer (the image field segments are within the SAW segment images as they correspond to each other for comparison purposes);

storing the captured images (both the design data and the inspection data are stored in memory as seen in figures 1 and 23);

for each stored image, assigning a defined SAW segment index to at least one image field segment within the image according to the positions of the camera and the mask with respect to each other when the image is captured ("during inspection of the flaw of the mask, the design data of the pertinent block is read out from the magnetic disk 12 by the data processing device 14 in the order of the scanning by the line sensor" at col. 11, line 11; as the system is aware of the pertinent design data for the current block image data being read, the design data BD(m,n) is assigned to each image segment); and

comparing contents of image field segments of stored images with each other (figure 1, numeral 24), wherein each compared field segments of each pair of compared field segments has the same SAW segment index and the same image segment index (each subsequent mask to be inspected for a single reference design mask will have the blocks indexed in the same manner as described above).

Arai et al. does not disclose an apparatus for analyzing a semiconductor wafer exposed multiple times using the mask.

Shibata et al. teaches an apparatus for analyzing a semiconductor wafer exposed multiple times using a mask (figure 2).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to analyze the semiconductor wafer of Shibata et al. in the apparatus of Arai et al. to be able to inspect the quality of an entire wafer when “a similar pattern is formed in every die (chip)” (Shibata et al. at paragraph 0032, line 2).

Regarding **claim 44**, Arai et al. discloses an apparatus in the field of endeavor of mask inspection (“mask inspecting apparatus” at col. 1, line 35) comprising:

a camera (figure 1, numeral 25);

a means for changing positions of the camera and the mask with respect to each other (figure 1, numeral 26 that produces the scanning path in figure 19, which is equivalent to applicant’s disclosed camera mover); and

a processing unit (figure 1, numeral 14) capable of:

dividing the mask into stepper area window SAW segments, all SAW segments having same dimensions (“DA, DB and DC read from the data file 10 into the data

processing circuit 14 are converted for each block B(m,n) (FIG. 19) by the data processing circuit 14 and are stored in the magnetic disk 12” at col. 9, line 2);

assigning to each of the SAW segments a unique SAW segment index, defining a set of defined SAW segment indices (“design data BD(m,n) of the block B(m,n)" at col. 9, line 36; figure 22; each block is assigned BD)

defining image field segments adjacent to each other within an image field of the camera (figure 20), the image field segments having the same image dimensions as images of SAW segments within the image field of the camera (“during inspection of the flaw of the mask, the design data of the pertinent block is read out from the magnetic disk 12 by the data processing device 14 in the order of the scanning by the line sensor" at col. 11, line 11; as the system is aware of the pertinent design data for the current block image data being read, the blocks are the same size such that comparison may be made), the area covered by the image field segments within the image field of the camera having different image dimensions that the images of the mask on the wafer within the image field of the camera (the total area covered by the image segments in figure 20 has different dimensions than the individual block images of the mask);

assigning to each image field segment a unique image segment index (as seen in figure 20, each block has an address of B(m,n));

capturing images of the mask with the camera at different positions of the camera and the mask with respect to each other (figure 20 as it pertains to generating reference design data and subsequent inspection data), image field segments within at least some images representing SAW segments of adjacent images of the mask on the

wafer (the image field segments are within the SAW segment images as they correspond to each other for comparison purposes);

storing the captured images (both the design data and the inspection data are stored in memory as seen in figures 1 and 23);

for each stored image, assigning a defined SAW segment index to at least one image field segment within the image according to the positions of the camera and the mask with respect to each other when the image is captured ("during inspection of the flaw of the mask, the design data of the pertinent block is read out from the magnetic disk 12 by the data processing device 14 in the order of the scanning by the line sensor" at col. 11, line 11; as the system is aware of the pertinent design data for the current block image data being read, the design data BD(m,n) is assigned to each image segment); and

comparing contents of image field segments of stored images with at least one master image (figure 1, numeral 24; the reference pattern data is a master image), wherein each compared field segments of each pair of compared field segments has the same SAW segment index and the same image segment index (each subsequent mask to be inspected for a single reference design mask will have the blocks indexed in the same manner as described above).

Arai et al. does not disclose an apparatus for analyzing a semiconductor wafer exposed multiple times using the mask.

Shibata et al. teaches an apparatus for analyzing a semiconductor wafer exposed multiple times using a mask (figure 2).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to analyze the semiconductor wafer of Shibata et al. in the apparatus of Arai et al. to be able to inspect the quality of an entire wafer when “a similar pattern is formed in every die (chip)” (Shibata et al. at paragraph 0032, line 2).

Regarding **claims 36, 39, 42 and 45**, the Arai et al. and Shibata et al. combination discloses a method and apparatus wherein each image field segment of the captured images represents a unique SAW segment on the wafer (“during inspection of the flaw of the mask, the design data of the pertinent block is read out from the magnetic disk 12 by the data processing device 14 in the order of the scanning by the line sensor" at col. 11, line 11; each current block image data being read corresponds to a unique design data block).

Regarding **claims 37, 40, 43 and 46**, Arai et al. discloses a method and apparatus wherein the SAW segments and image field segments are rectangular (as shown before, the segments are blocks that are rectangular).

Response to Arguments

5. Applicant's arguments with respect to claims 35-46 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KATRINA FUJITA whose telephone number is (571)270-1574. The examiner can normally be reached on M-Th 8-5:30pm, F 8-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on (571) 272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Katrina Fujita/
Examiner, Art Unit 2624

/Vikkram Bali/
Supervisory Patent Examiner, Art Unit 2624